REMARKS

Reconsideration of the subject application is requested in view of the foregoing amendments and the following remarks.

Claims 1-16 are pending. In this paper, claims 1, 11, 13, 15, and 16 are amended; claim 14 is canceled without prejudice; and the remaining claims are unchanged.

Applicant appreciates the search performed by the examiner in the course of performing a substantive examination of the application.

The amendments to the specification are to correct readily discernible errors such as typographical errors, errors in verb tense, and awkward language remaining from translation of this application from the original Japanese. No new matter is submitted.

FIGS. 3 and 4 are amended as requested in the Office action.

Claim 1 is amended to remove supererogatory matter.

Claim 11 is amended to clarify positional relationships.

Claims 13, 15, and 16 are each amended to make the respective claims independent. See also page 5, lines 8-14 of the specification.

The specification is objected to in paragraph 2 of the Office action. This objection is traversed. The Office action contends that claims 3 and 9 "claim that the x-axis and y-axis have orientations along the x-axis and y-axis, respectively." First, the x- and y-axes certainly do have orientations along the x-axis and y-axis, respectively. But, this is not what is claimed; i.e., the term "oriented" does not appear in either claim 3 or claim 9. Furthermore, the Office action contends, "The specification discloses the opposite, that the magnetic-field-compensation coil 32, which produces the x-axis magnetic field, has y-axis symmetry; following the y-axis magnetic field compensation coil 33 has y-axis symmetry." Again, these recitations of symmetry are not in the subject claims. If the examiner wishes to state an issue, he should state it clearly, which he did not do in the present instance. Clarification or withdrawal of the objection is requested. Notice is hereby taken that a mere restatement of this objection by the examiner in a subsequent Office action would not be responsive to Applicant's reasonable request for clarification.

In response to the objection (under 37 C.F.R. §1.75(c) and 35 U.S.C. § 101) to claims 13-15, claims 13 and 15 were rewritten in independent form and claim 14 was canceled without

prejudice. These actions by Applicant are believed to address the issue concerning these claims raised in the Office action. Withdrawal of the objection is requested.

Claims 15 and 16 stand rejected under 35 U.S.C. §112, ¶2. Withdrawal of the rejection is requested in view of the amendments to these claims, which are believed to cure the issue raised in the Office action.

Claims 1-16 stand rejected for alleged obviousness from a combination of Yamada et al. and Luzzi. This rejection is traversed.

As exemplary of the pending claims, claim 1 requires: (a) a magnetic-field sensor situated and configured to detect a magnetic field external to the CPB optical system, (b) a magnetic-field-compensation coil situated between the illumination-optical system and the projection-optical system or between the projection-optical system and the substrate, and (c) a magnetic-field-compensation circuit connected to the magnetic-field-compensation coil. The compensation circuit is configured to deliver an electrical current to the magnetic-field-compensation coil sufficient in direction and magnitude to cause the magnetic-field-compensation coil to produce a corresponding magnetic field that cancels at least a portion of the external magnetic field detected by the magnetic-field sensor.

The Office action admits that Yamada et al. "does not teach a detection and compensation system for magnetic fields." Applicant agrees, and also points out that this deficiency of Yamada et al. is substantial in view of the subject claims. Luzzi does not fulfill this deficiency of Yamada et al. in a manner leading to the combinations of features recited in the subject claims, such as claim 1. As readily discernible from FIG. 1 of Luzzi, this reference discloses a configuration as summarized in the instant application on page 2, lines 4-24. Specifically, in Luzzi, the compensation coil 16 completely surrounds the "magnetically sensitive instrument" (e.g., HREM) 10 and forms a respective magnetic field "around the instrument." Col. 4, lines 15-19; col. 7, lines 42-44; FIG. 1. Hence, Luzzi suffers from the disadvantages of conventional devices discussed on page 2, lines 15-24 of the instant application. (Note the position and size of the coil 16 relative to the instrument 10 in FIG. 1 of Luzzi.) Luzzi provides no teaching or suggestion of a magnetic-field-compensation coil situated between the illumination-optical system and the projection-optical system or between the projection-optical system and the substrate. Luzzi also provides no hint whatsoever as to why such a configuration would be

desirable or necessary, and provides no hint as to the advantages realized using a configuration as instantly claimed.

Independent claim 11 requires that a magnetic-field-compensation coil be placed between the CPB illumination-optical system and the CPB projection-optical system or between the CPB projection-optical system and the substrate, and that a magnetic-field-compensation circuit (connected to the magnetic-field-compensation coil) be configured to deliver an electrical current to the magnetic-field-compensation coil so as to produce a corresponding magnetic field that cancels at least a portion of the external magnetic field detected by the sensor. As discussed above with respect to claim 1, this combination of features is not disclosed or suggested in Yamada et al. or in Luzzi.

Independent claims 15 and 16 require that, in response to a detected external magnetic field, a corresponding magnetic field be produced locally in the vicinity of the optical axis, either between the illumination-optical system and the projection-optical system or between the projection-optical system and the substrate so as to cancel at least a portion of the detected magnetic field. As discussed above with respect to claim 1, this combination of features is not disclosed or suggested in Yamada et al. or in Luzzi.

As admitted in the Office action, "Luzzi discloses systems that are larger than the protected CBP [*sic*; claimed CPB] instrument . . . ." Applicant agrees, especially with respect to the magnetic fields produced by the coils 16 in Luzzi compared with the local fields produced by the magnetic-field-compensation coils of the instant claims. The Office action also states that "the apparatus and methods are directed at the charged particle beam." In reply, Applicant queries, "So what?" Apparatus and methods as disclosed in Luzzi "directed at the charged particle beam" do not cure the problems inherent in systems having such large coils, as discussed in the Background section of the instant application. Anything in Luzzi that may be "directed at the charged particle beam" does not solve all problems in all ways and contexts, and does not mean that any of those references solves the problems addressed by the instant claims in the manner recited in the instant claims.

Furthermore, without more than is disclosed in Luzzi, the skilled person would not bridge the gap between the very large coils (compared to the "instrument" 10) in Luzzi to the specifically configured and placed coils in the instant claims. Coils placed in different locations

of a CPB system perform different specific functions in different ways to achieve different results. The shortcomings of configurations such as Luzzi provided motivation to the Applicant to derive the devices and methods of the instant claims. I.e., configurations such as Luzzi simply did not provide the level of performance required by Applicant. Furthermore, regarding the detection and cancellation of stray magnetic fields, location and size of the detection and cancellation components are very important in determining specifically which fields are detected, which fields are canceled, and the degree to which field(s) are canceled. This is clearly apparent from the fact that configurations such as Luzzi provided inadequate performance for Applicant's needs, as noted above. Therefore, contrary to the contentions in the Office action, it would <u>not</u> be "an obvious matter of design choice to place the magnetic field compensation coil and the magnetic-field sensor in the CPB apparatus."

Furthermore, the examiner's statement that "[a] change in size is generally recognized as being within the level of ordinary skill in the art," was never intended (and cannot reasonably be intended) to encompass all situations and all technologies. In connection with the examiner's statement, the Office action cited *In re Rose*, which pertained to methods and apparatus for handling and storing lumber. The *Rose* Appellant, in attempting to distinguish his claims from prior art cited by the examiner, argued that his claims were directed to packages of lumber of size and weight requiring a lift truck for handling, whereas the cited prior art disclosed otherwise similar lumber packages that were smaller and less massive, and thus could be lifted by hand. In this context, the court ruled that size was not a patentable distinction. In the present instance, in contrast, conventional large coils as disclosed in Luzzi do not achieve the desired levels of cancellation of external magnetic fields, especially in the vicinity of the optical axis. If (for the sake of argument) the size of the Luzzi device were reduced in the manner alleged by the examiner, not only would certain coils be reduced in size, but also relative sizes of coils and other components would change. In the extremely complex technology of CPB microlithography and other CPB optical systems, changing relative sizes of components introduces many new variables. Some of these variables are unforeseen and have unforeseen consequences. Whereas Luzzi discusses a coil 16 that is substantially larger than the entire instrument 10, there is no basis in Luzzi for making the extrapolation that simply reducing the size of the coil 16 would work in the same manner as the coil(s) required by, and/or achieve the

same result as, the instant claims. Luzzi also provides no hint that such a size reduction would be necessary or desirable, or would work for their intended function without the introduction of extraneous effects that are unforeseen and possibly extremely deleterious to high-resolution CPB microlithography. Therefore, the argument and citation to the *Rose* case is misplaced and inapplicable to the instant claims.

The Office action also contends that it would be obvious from Yamada and Luzzi to place the detection and compensation systems in the manner currently claimed because "that is where the CPB is in need of focusing and that is where Yamada teaches the design to reduce the effects of external magnetic fields." This contention is incorrect and misplaced. In making the contention the Office action cites to col. 10, lines 5-23 of Yamada. In referring to the cited text, it is noted that it pertains to the locations of mask inlet deflectors 21, 22, mask outlet deflectors 23, 24, focus compensation coils 41, 44, and astigmatism compensation coils 42, 45. None of these components detects external magnetic fields or compensates for them. Furthermore, according to Yamada, placing these components close to each other "makes the overall length of the beam passage shorter, and effects of outside stray magnetic field and electron charges on the contaminated wall surface lighter." [Col. 10, lines 19-22.] Note that the quoted text says nothing about detecting external magnetic fields or compensating for them. Thus, it readily can be seen that positioning of deflectors and coils in the manner discussed in Yamada is not what is instantly claimed.

Hence, anything in Yamada concerning the locations of coils and deflectors does not provide any teaching or suggestion of providing the instantly claimed combinations of features directed to detecting external magnetic fields and offsetting their effects in the vicinity of the optical axis of the CPB system. Furthermore, in systems and methods according to the instant claims, the steps of detecting an external magnetic field and producing a canceling magnetic field are for the purpose of eliminating deleterious effects of such external fields, not specifically to achieve beam focusing. Furthermore, if it were as obvious as the Office action contends, then either or both of Yamada and Luzzi would have disclosed the instantly claimed methods. As discussed above, neither reference does.

Therefore, since none of the claims is obvious from any conceivable combination of Yamada and Luzzi, withdrawal of the rejection is proper and hereby requested.

Applicant has a right to an interview at this stage of prosecution. If any issues remain unresolved after consideration of the contents of this paper, the examiner is requested to contact the undersigned to schedule a telephonic interview. Any inaction by the examiner to make such contact, followed by issuance of a final action, will be regarded as an acquiescence by the examiner to grant an interview as a matter of right after the final action.

Respectfully submitted,

KLARQUIST SPARKMAN, LLP

By ______________________
Michael D. Jones
Registration No. 41,879

One World Trade Center, Suite 1600
121 S.W. Salmon Street
Portland, Oregon 97204
Telephone: (503) 226-7391
Facsimile: (503) 228-9446

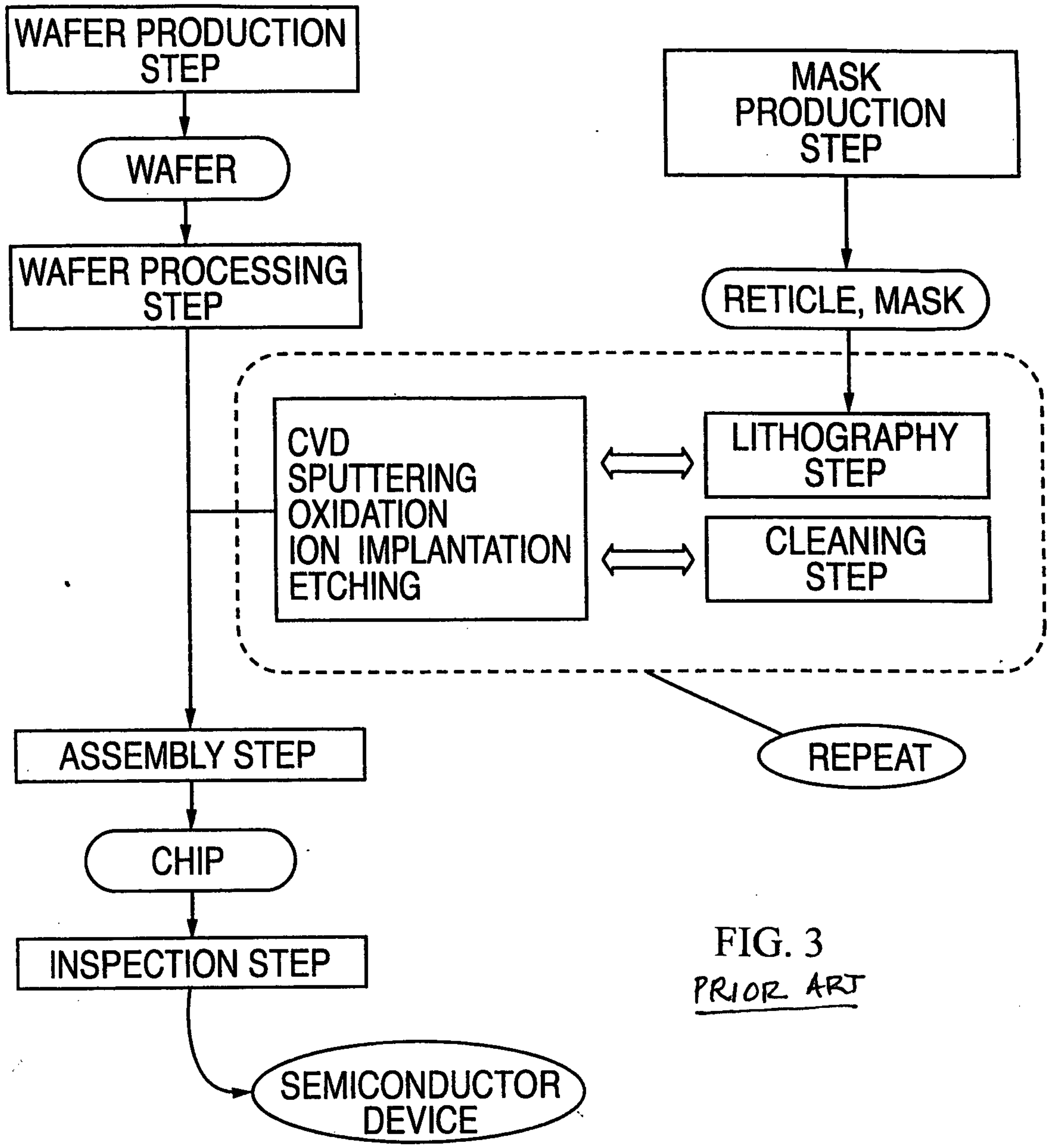

FIG. 3
PRIOR ART

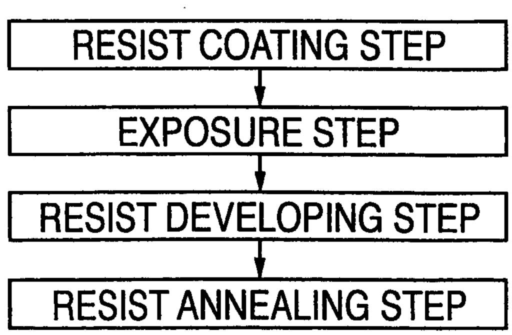

FIG. 4
PRIOR ART

LITHOGRAPHY STEP